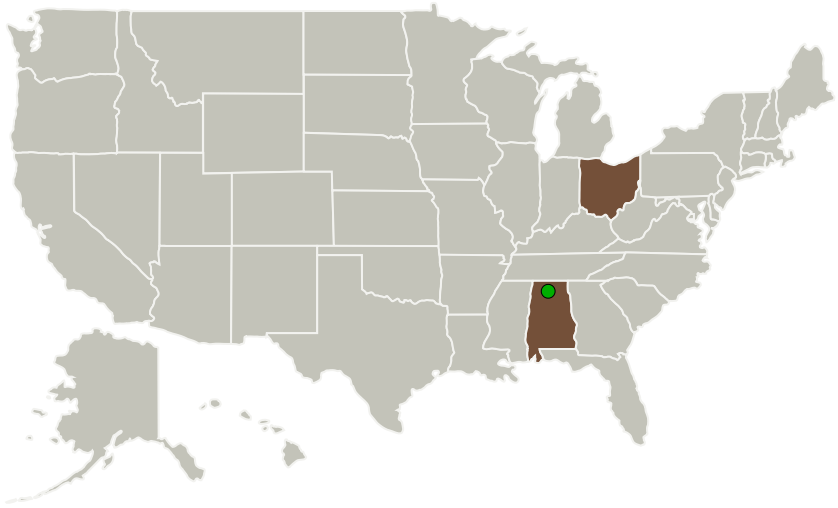
# NONA Cure of Prepreg Structures, Phase I

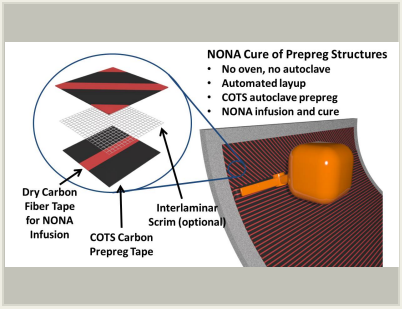
Completed Technology Project (2014 - 2014)

## Project Introduction

CRG's no-oven, no-autoclave (NONA) composite processing technology enables the fabrication of high-performance composite parts without the limitations imposed by autoclaves and ovens. The NONA infusion and cure of autoclave prepreg materials allows the manufacture of large primary composite structures without the expensive and energy-intensive capital equipment currently required for fabrication. The NONA process enables the remote fabrication of complex, integrated structures, dramatically shifting the composites manufacturing paradigm. Qualified autoclave or OoA prepreg tapes can be applied simultaneously with dry unidirectional (UD) tapes in an automated process. The presence of dry fibers throughout the layup before infusion allows improved breathing, removal of volatiles from prepreg, and improved compaction with only atmospheric pressure, mimicking the double vacuum debulk (DVD) process without the added equipment. NONA resin is then introduced to the evacuated layup at ambient temperature to wet out all available contact surfaces and cure itself and the prepreg in place. The NONA epoxy resin uses its own chemical energy to propel itself through a complete cure with no external heat required. With a high degree of crosslinking, the baseline NONA resin provides good strength, chemical resistance, and thermal performance up to 350 degrees F. Pairing NONA resin with a compatible prepreg, such as IM7/Cycom 977-3 or Hexcel IM7/8552-1, a cure of both systems can be achieved at room temperature. Because the cure occurs at room temperature, the NONA resin locks in its shape near room temperature, thus allowing the use of low-cost tooling materials, typically avoided because the of high coefficient of thermal expansion (CTE).

## Primary U.S. Work Locations and Key Partners






NONA Cure of Prepreg Structures Project Image

## Table of Contents

# NONA Cure of Prepreg Structures, Phase I

Completed Technology Project (2014 - 2014)

| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Cornerstone Research Group, Inc. | Lead Organization | Industry | Miamisburg, Ohio |
| Marshall Space Flight Center(MSFC) | Supporting Organization | NASA Center | Huntsville, Alabama |

| Primary U.S. Work Locations | |
|---|---|
| Alabama | Ohio |

## Project Transitions

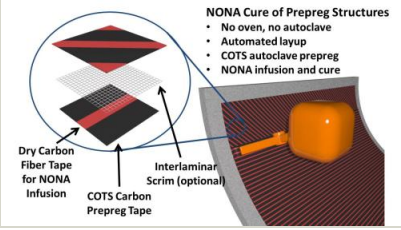
**June 2014:** Project Start

**December 2014:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/140552)*

## Images




**Project Image**
NONA Cure of Prepreg Structures Project Image *(https://techport.nasa.gov/image/131656)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Cornerstone Research Group, Inc.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Michael D Rauscher

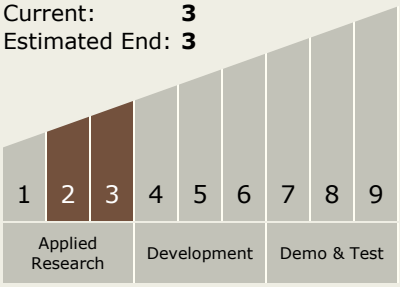
**Co-Investigator:**
Michael Rauscher

# NONA Cure of Prepreg Structures, Phase I

Completed Technology Project (2014 - 2014)

## Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**




## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System